Volume 8, Number 4 October 1995

JTSTEB 8(4) 501–738 (1995)

ISSN 0894-9867

Journal of Traumatic Stress

PLENUM PRESS • NEW YORK–LONDON

Journal of Traumatic Stress, Vol. 8, No. 4, 1995

Trauma, Traumatic Memory, and Research: Where Do We Go from Here?

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The papers in this series offer considerable insight into some of the more pressing issues associated with the subject of memory for trauma. These issues include basic questions about the role of context, content, inquiry format, and event characteristics in memory performance as well as the impact of individual factors such as developmental stage and affective status, to name a few. The authors, who describe both conceptual dilemmas and empirical data related to memory for a variety of stressful and traumatic events, each focus on themes pertinent to the understanding of how relevant, intensely personal experiences become memorable. Because the authors come from differing backgrounds, a spectrum of interpretative and empirical approaches are represented that span findings on developmental memory processes in youngsters recounting normative personal experiences to studies characterizing the mechanisms presumably implicated in the accessibility and coherence of personal information following adult rape.

The authors broadly concur that autobiographical or personal memory is a highly complex phenomenon. In a manuscript providing an extensive description of the bases of memory in the brain, Bremner, Krystal, Southwick, and Charney review the considerable extant data which confirm the existence of multiple memory systems in humans. These systems are subserved by a wide variety of neuroanatomic structures, many of which are highly sensitive to disparate but subtle neurochemical influences. These interactions may explain in part why the construct of memory is simultaneously clear-cut and complex (Cahill, Prins, Weber, & McGaugh, 1994). By highlighting the current neuroscientific literature, Bremner et al. offer

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0894-9867/95/1000-0717$07.50/1

a very useful substantive foundation on which to compare more subjective experience and individualized memory phenomena.

It is clear from the array of papers in this series that a combination of diverse neurobiological and psychosocial factors impact the accessibility, retrieval, and general memorability of salient personal experiences. In terms of human development, the articles by Ornstein, and by Fivush and Schwarzmueller, provide compelling information about the intrinsic capabilities (particularly breadth and strength) of children's memories for significant events. The authors highlight the especially critical contributions of certain developmentally-linked variables (e.g., age, cognitive maturation, social relationships, linguistic and comprehension skills; see also Goodman, Quas, & Batterman-Faunce, 1994) in the evolution of youngsters' memory abilities. Accordingly, these investigators emphasize the need for attention to the developmental progression of factors that influence basic abilities to attend, comprehend, interpret, and store important impressions.

Ornstein's paper provides data suggesting that even very young children are capable of recalling stressful personal events with detail, a highly controversial topic. The author concludes, however, that characteristics of the event itself prominently influence much of the substantive content in personal recollections. Of note is his hypothesis that stressful interpersonal events seem to be especially well remembered by children. Still, the data do not fully resolve questions about what factors specifically *facilitate* recall, nor does Ornstein's research wholly answer questions about the degree to which situational (i.e., situation-specific) variables shape recall as opposed to individual (i.e., person-based) characteristics. Accordingly, one could ask just how critical is the role of an event's initial saliency for later recollection? Also, what do we really understand about how certain individual experiences enable active recall versus informational inhibition or suppression in youngsters? Is it possible, for example, that some details are more central in the retention of a stressful experience than are others, and what are their characteristics? Furthermore, how does the interpersonal context surrounding an event influence subsequent recollection? For children in particular, does the presence of an involved, communicative parent enhance retention of interpersonal experiences, or is recall of stressors linked more directly to distinctive event features (e.g., novelty, surprise, stress, single occurrence)? Finally, even when an incident appears to be well retained in memory, how do we know that what children tell us represents their actual remembrance, rather than what they infer or comprehend from others about such events? Clearly, the range of these questions indicate that a wide scope of topics needs exploration, especially in terms of children.

Some research suggested that the basis of memories for moderately stressful (i.e., more "routine," expected, or common) life events is likely to

be substantially different from recall of more traumatic events. Several recent studies propose that very intense affect or arousal, as opposed to more moderate levels, interferes with the accuracy of recall by disrupting general attentional skills or the focusing of attention on details, a model consistent with earlier research on the differential effects of anxiety on task performance (e.g., Ellis & Hunt, 1993). Although the empirical study of memory for traumatic events is relatively new, questions about the impact of stimulus (i.e., event) properties appear to be very relevant for understanding cognitive responses or patterns associated with severe stress. The paper by Fivush and Schwarzmueller carefully examines children's retention of important personal events and reconfirms that children appear to remember a variety of events quite well. However, their data indicate that, in instances involving *non*-traumatic stress, the structure of young children's recollections is in fact influenced by a variety of sources, for example, input from interactions with adults. Still, despite this apparent developmental phenomenon, some studies of memory using free recall paradigms show that the impact of critical developmental factors diminish considerably when memory capacities are tested more broadly. Thus, it will be necessary to disentangle true developmental factors from methodological ones in resolving some of the discrepancies in research on recall of trauma.

Findings from the preceding studies strongly suggest that at least some aspects of personal memory are closely associated with the individual's comprehension skills and the corresponding capacity (or possibly susceptibility) for interpreting cues embedded in interactions with important others at the time of recollection or description. In light of findings that social context is a prominent factor in shaping children's memory productions, what contextual variables are especially important for subsequent retention? Also, how should data on more basic memory performance be differentiated from findings that point to the importance of contextual factors? At least in children, and possibly in adults, social context, social mores, personal identity, and cultural values seem to strongly affect certain cognitive processes associated with memory production (e.g., the structure of narratives). Accordingly, one important challenge for both clinicians and researchers will be to determine the degree to which observed alterations in memory constitute actual (or "true") memory changes (i.e., losses or decrements) rather than the respondent's sensitivity to a particular response set (e.g., the incorporation of personally relevant social cues). To the degree that research fails to distinguish between retention and reporting characteristics, we can expect to find considerable variation not only across developmental stages but across diverse sociocultural contexts as well.

By studying children in both laboratory and naturalistic settings, Fivush and others further broaden the context in which salient personal

memories can be observed, enabling comparisons between laboratory and real-life settings. Although these researchers have found that children are generally capable of stable recall following repeated inquiry, some noteworthy variations in youngsters' recall exist, leading to yet another set of questions. Is it possible that systematic or repeated inquiry by a significant other conveys critical information about an event, subtly influencing the style, form, and content of subsequently (re)produced memories? If this occurs, how can the clinician or researcher distinguish the influence of social input on memory narratives from original—and more presumably more accurate—internal, memory representations? As noted by one reviewer, we do not fully understand the disparate effects of rehearsal and retrieval processes in the consolidation of memory traces. If these activities influence recall, is it the retrieval process or the memory itself that is being enhanced? This is an important issue in terms of assessing the "validity" of certain memories. Regardless, the impact of repeated questioning and inquiry appear to have discernible effects. Some of this confusion may be resolved by improving efforts at delineating *what* characteristics or aspects of memory are of central interest (e.g., the totality of an event versus a single component), accompanied by more careful study of *which* event characteristics change following either spontaneous narration or inquiry. Clearly, both conceptual and assessment issues will need to be addressed in more detail to appreciate the multiple effects of inquiry on recollection.

The papers by Williams and by Elliott and Briere similarly highlight the importance of attention to the context and format in which personal information about a traumatic event is elicited and described. These authors both describe the dramatic finding that an appreciable number of childhood sexual abuse survivors within the general population (in Williams' study, those with documented childhood trauma) fail to remember the index event initially as adults. Portions of subjects in both samples, for example, describe periods of time when they had substantially less recall or awareness of earlier traumatic events. In some of the cases, these memory fluctuations were associated with significantly more PTSD symptomatology than in cases where reported memories were recalled more consistently or from early on. In Elliott and Briere's study, in particular, more recent awareness or recall for the index event was strongly linked to greater stress symptomatology. These results offer compelling evidence that at least some components of autobiographical recall and retention operate beyond our current understanding of recall chronology and symptom effects. Although the interconnections among these processes are not entirely clear, the studies suggest nonetheless that it is premature to conclude that the presence of such recall failures in adulthood negates the likelihood of the event's earlier occurrence. Similarly, increasing numbers of studies sug-

gest that it is inaccurate to attribute only psychological or motivational factors (e.g., conscious suppression or blocking) to demonstrated problems with spontaneous recall.

The preceding findings raise important questions about the potential role of clinical status, in particular high levels of emotional distress or arousal, in the genesis and maintenance of trauma-related memories. Although considerable data have shown that certain affective states (e.g., clinical depression) are powerful mediators of the ability to describe, label, and retrieve important experiences, few studies have addressed how symptoms of *traumatic stress* may be implicated in autobiographical recall. Future research will need to investigate in detail a series of issues including: (a) whether PTSD as a disorder is directly and distinctively linked to changes in autobiographical memory, (b) whether *certain* symptoms of PTSD are more critical in particular components of recall, and (c) whether symptoms of traumatic stress are correlated—but not causally linked—to changes in recall abilities. As Rogers suggests in her review paper, considerably more research is needed to probe these dilemmas. Van der Kolk and Fisler's paper emphasizes that the perception and storage of trauma-related memories differ substantially from the processes implicated in the consolidation of more affectively neutral events, even those associated with mild levels of stress. A variety of explanations are possible, ranging from the symbolic-psychodynamic to the neurophysiological. Although differing in etiology, each model emphasizes the importance of phases and components of information processing, for example, especially the importance of an event's salience on its retention. Van der Kolk and Fisler point out that the presence of certain clinical phenomena (e.g., dissociation) at the time of the event are likely to be very relevant in terms of how recollections are structured, understood, and accessed at subsequent time points. This hypothesis underscores again the need to consider both personal and event characteristics in understanding how memory operates during stressor exposure and ensuing traumatization. Van der Kolk and Fisler question whether cognitive processes implicated in the formation of personal memories following traumatization should be conceptualized as separate and distinct compared to processes associated with memories for events where traumatization does not occur, given preliminary evidence for perceptual alterations during dissociation. As such, clinical status may be especially relevant in the formation and retention of memories when alterations in mental status or consciousness are thought to have occurred.

Two of the papers, those by Foa, Molnar, and Cashman and by Tromp, Koss, Figueredo, and Tharan, stress the utility of considering semantic coherence and the linguistic structure of traumatic memories as potentially central dimensions in autobiographical recall. This approach implies that

various qualitative language- and memory-based features should be explored in addition to the traditional emphasis on quantitative dimensions of performance (e.g., total units retained). The research described by these authors further supports clinical work which, to date, shows that assessment of the verbal characteristics of memory narratives can afford an unusual opportunity to evaluate parameters of encoding, storage, integration, and retrieval in personal memory. These articles address how memories for highly distinctive personal trauma (i.e., rape) are retained and recalled over time, or in comparison with experiences of more broadly negative events, by examining the reported verbalized content and structure of event memories. Somewhat surprisingly, Tromp et al.'s study reports that women's memories for rape were considerably less clear or vivid and less well remembered overall than their recollections for unpleasant, *non*-traumatic incidents. As a corollary, participants reported that their remembrances of traumatic sexual assaults were talked about and thought about far less frequently than were other experiences. Thus, despite the expectation that the rape experiences would be linked to more vivid event recollections, these studies demonstrate considerably different patterns of recall and cognitive organization following such events.

Foa et al.'s paper dealing with the progression of narrative analyses in rape victims provides data on other important topics, specifically: (a) the application of existing methodologies using narrative analysis to the study of rape memories, and (b) examination of the effects of direct therapeutic exposure treatments on the longitudinal course of trauma recollections. By defining and quantifying affective and linguistic components of trauma narratives, Foa et al. graphically show how certain cognitive-behavioral therapies simultaneously impact both the content and organizational structure of verbal remembrances of rape. Research by these investigators also helps explicate the relationship of clinical symptomatology to narrative production and recall, in particular, the ways in which anxiety symptom reduction is linked to more coherent narrative content.

Along with these empirical findings, this study raises several critical methodological and substantive issues. Along what specific dimensions, for example, should such analytic approaches classify respondents' perceptions, feelings, and verbalizations generated during exposure treatment? Also, how should structural and content-based components of these narratives be categorized to most accurately reflect any changes over time? Furthermore, to what degree can we assume that verbal recollections uttered during therapeutic exposure constitute equivalents of trauma memories? Because the studies described here rely extensively on use of *verbalized* recollections, these findings raise additional questions about the roles of rehearsal and disclosure for autobiographical memory. To what degree, for

example, do social context and perceptions of social support or acceptance serve as mediators of abilities to recall *and/or* express remembrances of traumatic events, and are there likely to be differences between traumatized and nontraumatized individuals? Finally, how should willingness to disclose be operationalized so that it is possible to differentiate its effect from more primary explicit remembrances?

Despite these questions, the process of examining narrative changes using prescribed dimensions and specified quantitative and qualitative dimensions appears to be a potentially useful method for improving our understanding of both the formation and retention of memories for highly salient events. Presumably, explorations of recall-based narratives within and across differing therapy modalities will promote examination not only of the structural components of these remembrances but also the related issue of *which* situational and individual characteristics are ultimately associated with meaningful linguistic, affective, and substantive shifts. Overall, this form of research is likely to help shift scientific inquiry further away from more dated views of recall as a static, unitary phenomenon to the growing awareness of memory as a multidimensional process that is contextually sensitive.

The research described here directly reinforces the need to address the impact of multiple factors in personal recall. Several articles highlight the necessity for improving knowledge about the role of spontaneous versus elicited descriptions in event recall. Although Bremner et al.s' paper provides abundant neurobiological, neurochemical, and neurophysiological support for the broad effects of neural activation on the encoding, storage, and retrieval of meaningful stimuli, other papers in this series firmly implicate a range of diverse behavioral, developmental, psychosocial, and interactional variables in both the formation and retention of trauma memories. If certain variables like narrative (re)construction, covert rehearsal, temporal and contextual parameters, and individual background characteristics are confirmed as influential in the acquisition and retention of personally meaningful experiences, then it is clear that additional valid and reliable measures of these domains will be needed for future research.

In her review paper, Rogers offers a number of points directly dealing with future trends in empirical research on trauma memory. These points span theoretical and pragmatic issues and address, for example, the need for more research on characteristics of psychogenic memory loss along with improved study of reported inabilities to recall highly salient events. Rogers suggests that by contrasting cases involving intact recall with those where recall appears deficient, it should be possible to learn considerably more about what constitute predictable aberrations in *normal* memory as opposed to conditions where highly idiosyncratic, atypical, or pathological perform-

ance can be expected. This type of comparative approach is likely to benefit clinicians and researchers alike, and can serve as a bridge between existing theories of "normal" memory and forgetting and those dealing with more unusual or pathological occurrences. Rogers also questions whether certain phenomena following some traumatization (e.g., dissociation, partial amnesia) should be interpreted as variations in normal performance or should be construed as unique to the process of traumatization. If the latter view is supported, such an approach might suggest that the study of memory during (or for) trauma should be conceptualized as outside the general field of memory, an approach which could seriously constrain broader, comparative scientific inquiry. In contrast, Rogers proposes numerous areas where communality of interests exist, demonstrating their applied relevance through a comprehensive and balanced review of studies on normal and pathological memory. These studies together help highlight that the process of remembering—whether for broadly important life events or highly personal traumatic occurrences—is a multidimensional construct that should not be addressed simplistically by a single set of conceptual models or empirical approaches.

Beyond their individual contributions, the papers in this series identify a number of remaining substantive and methodological issues. In terms of substantive content, it is evident that studies evaluating traumatic events from the distant past are faced with particular problems typically linked to retrospective reporting. These include issues of reporting bias, variations in forgetting, effects of subjective appraisal, and the probable impact of multiple intervening life events on event appraisal and recollection. Furthermore, as research in this series demonstrates, an impressive array of person-based characteristics are influential in stress-related, autobiographical memory including, notably, age at the time of exposure, affective response, age at the time of reporting, and certain personal characteristics (e.g., clinical status, level of distress, mood state). It is not clear at this point whether symptoms of PTSD in particular appreciably impact the process of recall and, if so, whether these effects are specific or discriminable from those imposed by more generalized psychological distress on (see, for example, Pitman, 1988). To date, some research, including the study by van der Kolk and Fisler, has suggested that traumatic stress (i.e., PTSD) and related serious clinical conditions (e.g., dissociative disorders, multiple personality disorder) may be unique in their effect on the perception and recall of highly stressful events. Since these variables affect retrieval and recall in distinctive ways, more empirical research is needed to systematically evaluate their individual impact.

To improve methodologies further, research in this issue suggests that both experimental hypotheses and study constructs require improved defi-

nition and operationalization. To date, only some research methodologies are sufficiently detailed or standardized, limiting opportunities for comparative analysis and replication. Accordingly, greater use of comparable methods and procedures across studies will expand possibilities for generalizing findings across diverse populations. It is also essential that data be clearly and explicitly quantified so that conceptual models can be widely reviewed in the context of the data that support (or disprove) them. A further concern relates to the broad applicability of findings. How should findings from treatment-seeking and clinically symptomatic groups be compared to those involving non-clinical samples? To what extent can such findings be assumed to apply to community-based populations? To address this issue, it is possible that samples should be characterized in some broader or more uniform way, including delineation of a specified range of demographic and background variables. Foa et al.'s and Elliott and Briere's findings that certain symptoms of PTSD and anxiety are differentially associated with narrative and recall characteristics suggest that the clinical status of samples should be carefully assessed and defined. To the degree that samples as well as paradigms are well described, confusion over seemingly contradictory findings will be reduced.

Overall, prospective studies are potentially the most useful for addressing many of the issues raised here. These studies potentially offer better opportunities for conducting baseline assessments as well as for measuring relevant temporal and contextual parameters. Prospective designs have the additional advantage of obtaining collateral subject reports, thus improving reliability and reducing some of the concern with limitations of retrospective methodologies. Prospective studies also can investigate factors associated with *spontaneous* recall, experimentally manipulating sets of variables over both time and condition. These laboratory investigations, for example, might use any number of carefully controlled paradigms to explore how, and under what conditions, certain classes of stimuli differentially affect retention *and/or* access to personally relevant material. Other studies might consider whether contextual (situationally-based) or affective (individually-based) congruence meaningfully affects either the *constancy* or *consistency* of trauma recall. This combination of studies could lead to improved clarity concerning the degree to which autobiographical memory for traumatic experiences constitutes a distinct phenomenon worthy of separate consideration rather than a point on the continuum of memory in general (e.g., McCloskey, Wible, & Cohen, 1988).

Studies that emphasize overt behaviors and explicit factors associated with remembering are likely to promote better understanding of memory processes following trauma than studies of experiences whose characteristics cannot be objectively assessed. Still, when prospective methods are

not feasible, clearer descriptions of retrospective study methods and their attendant limitations will foster better appreciation of what these studies can tell us. As various lines of investigation evolve, expanded linkage among well-developed theories, clearly defined constructs, rigorous paradigms, and standardized measures from a range of fields (e.g., cognitive science, neuroscience, developmental psychology, psychopathology) will contribute fruitfully to more sophistication about both the development and maintenance of traumatic memories as well as their varied impact on outcome.

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Journal of Traumatic Stress, Vol. 8, No. 4, 1995

Acknowledgment of Ad Hoc Reviewers for Volume 8

The following persons reviewed manuscripts submitted from July 1, 1993, through June 30, 1994. (An asterick indicates that more than one manuscript was reviewed.)

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